

UNITED STATES PATENT OFFICE.

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MANUFACTURE OF VEHICLES, &c.

No. 802,416.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JACOBUS SPYKER, a subject of the Queen of the Netherlands, residing at Trompenburg, near Amsterdam, Netherlands, have invented certain new and useful Improvements in or Relating to the Manufacture of Vehicle-Bodies and other Curved or Bent Bodies or Articles, of which the following is a specification.

The present invention relates to the manufacture of vehicle-bodies and other curved or bent bodies or articles, more particularly of so-called "tonneau" bodies for motor-cars; but the invention can also be applied to the manufacture of other curved, spherical, or cylindrical articles, smooth or ornamental, which have to possess a certain degree of rigidity and resistance—such as, for instance, arm-chairs, seats, basins, baths, pails, balloon-cars, and the like—and it is specially suitable for the manufacture of articles of large dimensions bent or curved in various directions.

The object of the invention is to produce such articles at relatively very low cost and of great lightness and rigidity.

The invention substantially consists in constructing a non-metallic core or support of the desired shape and dimensions and in providing this core by electrolytic means with a metallic coating of the desired thickness in order to give it the necessary strength.

An essential part of the invention consists in the method of constructing the core or support in such a manner that the latter itself, while being very light, possesses the desired degree of rigidity and resistance and will not lose its shape in the acidulated electrolyte. When this core has been made, it is perforated either for its entire extent or only along certain lines traced according to the direction of the principal curves of the article to be formed, so that the electrolytic deposit substantially produces a body consisting of two plates or the like inclosing the core and connected to each other by means of metallic rivets or connecting-pieces, by which their connection with the core or interior support is at the same time strengthened. In some cases rivets or metal connecting-pieces can be placed in the perforations before the electrolytic deposit is formed, and these will subsequently be fixed by means of the said deposit. The connection of the two plates in this manner and the difference in their curvatures, owing to one of them being on the outside and the other on

the inside of the curved core, cause the plates to assist each other in resisting pressure and bending strains while bearing on the interior support.

In the following description the method for constructing the core or interior support will be described in detail.

To construct the core or support, a matrix or mold is first made the inner surface of which, either smooth or ornamental, has the shape of the vehicle-body or the like to be constructed. This inner surface is moistened with water by suitable means, and strips of paper are then applied thereto, the length and breadth of the said strips being dependent on the radii or shape of the matrix curves, which they must cover smoothly without folds. The paper strips are affixed in such a manner that they cross one another in superposed layers in order to give resistance along the different curves. Each layer is provided with a coating of isinglass, gelatin, or the like, to which a certain quantity of bichromate of potassium has been mixed. After each application of glue or the like the interior of the mold—that is to say, the coating applied to the said interior—is illuminated by means of a powerful electric furnace, producing a white light, which acts on the bichromate of potassium in such a manner as to "fix" the glue and render it insoluble in water. A layer of vegetable fiber or fabric, preferably with large meshes, is then applied to the paper and glue, this fabric being arranged in the same manner as the paper—that is to say, in the shape of crossed bands or strips. Good results have been obtained by means of narrow bands of fabric. It is, however, preferable to use bands made of natural fibrous or ligneous material, which can be obtained by beating and flattening small strips of wood or bark peeled from certain trees. When these strips have been sufficiently flattened, they have the appearance of coarse wide-meshed fabric, having a certain degree of elasticity, as well as considerable resistance of traction. The strength of this natural fabric evidently depends on the nature of the fiber and of the texture of the wood from which the strip has been peeled. Particularly supple and resistant materials of this kind are known to commerce, and they are manufactured from the beaten, pressed, and flattened bark of certain trees, such as the kajoe terep (*Artocarpus elastica*) and the atap.

As already stated, it is of great advantage to use beaten bark instead of fabric. The choice of the artificial or natural tissue depends as much on its texture, size of the meshes, and so on, as on its strength, since it is of great advantage for the manufacture that the said tissue should absorb a large quantity of glue. The bark of the kajoe terep or the atap or the like is applied in the same manner in the form of narrow crossed bands. To the layer of artificial fabric or natural tissue (beaten bark) a thick layer of bichromated glue is applied, which is also illuminated in order to be fixed and rendered insoluble in water. Upon the layer of fabric or bark and glue another layer of paper is placed and on the latter another coating of glue, which is fixed by means of light, and the body thus built up can then be removed from the mold. Finally, bichromated glue is affixed to the exterior surface of the paper which was in contact with the mold, and this glue is also fixed in the manner described. The rigid core or support is then complete. Before fixing the two first coatings of glue it is desirable in order to produce intimate connection between the various elements of each layer with its coating of glue to apply powerful pressure. Since, however, curved outlines are frequently very complicated, it is impossible to use swages or dies for this purpose, so the mold or matrix, with the layers thereon, is introduced into a closed chamber of a suitable height, and a suitable quantity of sand is then poured into the said chamber, whereupon hydraulic pressure can be applied. After being subjected to this pressure the core is of course thinner and stronger than if it had been simply glued. In any case, however, the core or support is very light and combines with a certain degree of elasticity the desired rigidity and resistance which enables it to resist impacts, shocks, and the like without becoming dented or distorted, as would be the case with sheet-aluminum or the like. The manufacture is very easy and rapid. In manufacturing cores for motor-car bodies the seat can in some cases be made in one piece with the back of the body. The thickness of the core also depends on the number of layers of each material used in its manufacture. Experience has shown that three single layers—namely, paper, fabric, or bark and paper—with coatings of glue were sufficient for the production of a very rigid and resistant core.

The core thus built up is pierced with small holes, as has been mentioned above, and is then prepared in the known manner for the electrolytic deposit by coating its surface with plumbago or carbon. The core is then introduced in the electrolytic bath, in which it remains for the length of time necessary to obtain a deposit of sufficient thickness to give the required rigidity and resistance. The metallic plates which are formed upon the two

surfaces opposed are connected to each other by means of connecting pieces or rivets formed in the holes by the electrolytic deposit. Since the core resists the action of acidulated water, it is not damaged in the bath. The metallic deposit preferably used is a deposit of copper. When the body is removed from the electrolytic bath, it consists, therefore, substantially of two metallic plates of different curvature connected to one another by cross-pins or the like and inclosing a core or support to the shape of which they correspond. These various elements are coöperating factors which are combined with the object of imparting to the product, notwithstanding its great lightness, slight thickness, and extensive curvature, the desired rigidity and resistance which will enable it to withstand the mechanical influences—such as pressure, bending strains, impacts, shocks, vibrations, and the like—and also physical influences, such as change of temperature, heat, cold, moisture, and the like. The metallic coating can of course be provided with a coating of paint or varnish or can be plated with gold, silver, bronze, or the like.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The method of manufacturing vehicle-bodies and the like consisting of first constructing a core of any desired contour, perforating the same, and providing the core by electrolytic means, with metallic connecting portions within the perforations and a metallic cover formed with said portions.

2. The method of manufacturing vehicle-bodies and the like consisting of first constructing a core of affixed layers of non-metallic material, perforating the same, and subsequently providing the core by electrolytic means with a metallic covering and with metallic connecting means within the perforations.

3. The method of manufacturing vehicle-bodies and the like consisting of first constructing a core of affixed layers of non-metallic material adapted to resist the action of water, perforating the same, and subsequently providing the core by electrolytic means, with a metallic covering and with metallic connecting portions within the perforations.

4. The method of producing vehicle-bodies and the like consisting of first forming a layer of paper bands, covering it with glue, applying a layer of fabric, covering it with glue, applying a second layer of paper, then covering the entire product with glue and finally providing said product, by electrolytic means with a metallic coating.

5. The method of producing vehicle-bodies and the like consisting of first forming a layer of paper bands, then applying a layer of fabric and then a layer of paper, said layers being affixed one to the other by chromated glue which is subjected to light subsequent

to its application, then covering the product with chromated glue, subjecting it to the action of light, and providing the product by electrolytic means with a metallic coating.

5 6. The method of producing vehicle-bodies and the like consisting of first applying to a mold a multiplicity of successive layers of fabric and glue, placing the mold and layers in a chamber and finally pressing a column of sand into the chamber, said sand adapting
10 itself to the shape of the layers and subjecting them to uniform pressure.

7. As a new product, vehicle-bodies and other curved bodies consisting of two electrolytically-deposited metallic plates of different curvature connected to each other by means of connecting pieces or rivets and enclosing a light core or support constructed of crossed paper strips and strips of fabric or
15 20 tree-bark with interposed coatings of bichro-

mated glue rendered insoluble in water by exposure to light.

8. As a new article of manufacture, a body consisting of a core, of superposed layers of paper and wood, with fixed bichromated glue
25 therebetween, and a metallic cover deposited upon all surfaces of the core.

9. As a new article of manufacture, a body consisting of a core of superposed layers of paper and wood with fixed chromated glue
30 therebetween, said core being perforated, and a metallic cover deposited upon all surfaces of the core and within the perforations.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JACOBUS SPYKER.

Witnesses:

GERRIT ABRAHAM VON HUNTELN,
AUGUST SIEGFRIED DOCEN.